July, 1958

THE CHEMIST

VOLUME XXXV NUMBER 7

Harold A. Levey

Receives Honorary AIC Membership

(See Page 345)

How B&A® meets your needs for

BORON TRIFLUORIDE

Gas and Complexes

With large-scale production... Baker & Adamson has long been the leader in production of BF_3 gas—shipping this versatile catalyst in large trailer trucks like those you see being loaded above. B&A pioneered this method of shipment and today has a fleet of these trucks always on the road, serving the needs of the process industries.

With reference data . . . Baker & Adamson has compiled a considerable amount of reference data on the applications of Boron Fluoride gas and complexes. Boron Fluoride's wide range of applications and its cost-cutting production advantages—such as its ease of catalyst removal—make it a factor to be considered in almost any organic synthesis problem.

Write today—for technical data on properties and typical uses of B&A Boron Trifluoride gas or any of the complexes listed. Company letterhead, please.

Ether (Diethyl) Complex
Phenol Complex
Diacetic Acid Complex
Di-n-Butyl Ether Complex
Dihydrate
Ethyl "Cellosolve" Complex
Hexamethylenetetramine Complex
Monoethylamine Complex
Para-cresol Complex
Triethanolamine Complex
Urea Complex

BAKER & ADAMSON® Fine Chemicals

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte Chicago • Cleveland (Miss.) • Cleveland (Ohio) • Denver • Detroit • Houston • Jacksonville Kalamazoo • Los Angeles • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh Portland (Ore.) • Providence • San Francisco • St. Louis • Seattle • Kennewick, Vancouver and Yakima (Wash.)

Standard Model No. 3

WILEY LABORATORY MILL

- **on new Portable Stand and with Spillage Tray**

4275-R3 with 4275-F6 and 4275-Z.

For preparation, with minimal loss of moisture from heating, of a wide variety of materials for analysis. Principal advantages of new model: harder cutting edges permitting wider range of materials including Teflon, polyethylene resins, titanium scrap, etc.; quieter operation; and baked gray enamel and chromium plated finish, etc.

As in earlier model, four hardened steel knives on revolving shaft work with shearing action against six knives bolted into frame. Shearing action of cutting edges, between which there is always clearance, minimizes loss of moisture, avoids temperature rise, liquefaction, contamination, etc., making this mill satisfactory for many materials which cannot be reduced by other mechanical means. Ground material must pass through a sieve dovetailed into frame above receiver.

Furnished with cast aluminum drawer, 28 oz. capacity, for collecting sample.

4275-R3. Wiley Laboratory Mill, Standard Model No. 3, motor driven, mounted on enclosed base, with drawer of cast aluminum. With ½ h.p. continuous duty motor, 1725 r.p.m.; starting switch with thermal overload cutout; V-belt, belt guard; three sieves with openings of ½ mm, 1 mm and 2 mm diameter. For 115 volts, 60 cycles, single phase, a.c. Without Stand or Tray..... **876.50**

4275-F6. Spillage Tray Attachment, for use with above, consisting of bracket and Stainless steel tray..... **23.00**

4275-Z. Portable Stand, 10 inches high, for mounting above Mills. Consisting of rubber insulated platform 23½ inches square, mounted on ball-bearing, swivel casters with foot-operated wheel brakes..... **119.00**

Copy of Bulletin 129 sent upon request.

A.H.T.CO.

ARTHUR H. THOMAS COMPANY

More and more laboratories rely on Thomas / *Laboratory Apparatus and Reagents*

VINE ST. AT 3RD • PHILADELPHIA 5, PA.

Telephone Service: Direct private wire New York to Philadelphia (no toll charge) REctor 2-5035

The CHEMIST

Reg. U. S. Pat. Off.

Publication of

THE AMERICAN INSTITUTE OF CHEMISTS, INC.

60 East 42nd street, New York 17, N. Y.

Entered as second class matter April 8, 1936 at the Post Office at New York, N. Y., under Act of August 24, 1912. Issued monthly.

Subscription price, $2.00 a year to Members, $3.00 to Non-Members. Single copy, this issue, $0.25. Copyright, 1958 by THE AMERICAN INSTITUTE OF CHEMISTS, INC.

Vol. XXXV July, 1958 Number 7

Editor: V. F. KIMBALL

Advisory Board

Dr. Ray P. Dinsmore, The Goodyear Tire & Rubber Co., Akron, Ohio.

Lawrence H. Flett, Consultant, National Aniline Div., Allied Chemical & Dye Corp., New London, New Hampshire.

Dr. Bernard S. Friedman, Sinclair Research Labs., Inc., 400 E. Sibley Blvd., Harvey, Ill.

Richard L. Moore, W. R. Grace & Co., 3 Hanover Sq., New York 4, N. Y.

Dr. Walter J. Murphy, ACS Applied Publications, Washington 6, D. C.

Dr. W. George Parks, University of Rhode Island, Kingston, R. I.

Dr. L. F. Pierce, L. F. Pierce Laboratories, Los Angeles 57, Calif.

Dr. Malcolm M. Renfrew, Spencer Kellogg & Sons, Inc., Buffalo, N. Y.

Dr. William J. Sparks, Esso Research & Engineering Co., Linden, N. J.

Contributing Editors

M. R. Bhagwat, 1839 Niagara Ave., Niagara Falls, N. Y.

D. H. Killeffer, 168 Westchester Ave., Tuckahoe 7, N. Y.

Dr. Frederick G. Sawyer, Vice President, Jacobs Engineering Co., 774 East Green St., Pasadena, Calif.

Florence E. Wall, Consultant, Writer, 210 East 68th Street, New York, N. Y.

Martin B. Williams, Rocket Dev. Labs., Redstone Arsenal, Huntsville, Alabama

Department Editors

Condensates, Dr. Ed. F. Degering

Opportunities, Doris Eager

Chemical Books Abroad, Dr. Rudolph Seiden

Deadlines for *The Chemist*

The deadline for the September issue of The Chemist is August 10th. Advertising copy for September should be received not later than August 15th.

THE AMERICAN INSTITUTE OF CHEMISTS does not necessarily endorse any of the facts or opinions advanced in articles which appear in THE CHEMIST.

IN THIS ISSUE

Editorial: The Bond Between Us 341

Special AIC Announcements:

- **Add to Charter Member List** 341
- **New Committees 1958-1959** 342
- **Louisiana Chapter Officers** 343
- **The 1959 Annual Meeting** 343
- **Niagara Chapter Elects** 343
- **Dr. Ott to Speak Before Joint Meeting** 343
- **Western Chapter Officers** 344
- **New York Chapter Officers** 344
- **New Officers for Ohio Chapter** 344

The Sale of Chemical Services in Counsellor Capacity, Harold A. Levey, Hon. AIC 345

Benefactor of Science and Scientists, Dr. C. H. Fisher, F.A.I.C. 347

Presentation to Harold Levey 349

About AIC Members 350

The Collapse of Time, J. Lewis Powell 351

The Chemist and Air Pollution, Dr. Leslie A. Chambers 361

The Chemist and Rockets (Abstract), R. J. Thompson, Jr. 364

Council 365

Opportunities 368

TO COME IN AUGUST

Dr. W. T. Read, Hon. AIC, who recently received the Honor Award of the Washington AIC Chapter, will be the human interest story. The series on "Understanding the Creative Process," by Dr. Maurice J. Kelley, F.A.I.C., postponed from July, will be completed. Other interesting papers, from the Annual Meeting, will appear as space permits.

Recommended Suppliers and Services

Norman Applezweig Associates 359
Baker & Adamson Division Allied Chemical ..... Inside Front Cover
Bios Laboratories ..... Inside Back Cover
Food & Drug Research Labs., Inc 349
Gordon & Campbell 363
O. Johnson 348
La Wall & Harrisson 357
The Lento Press 363
Arthur D. Little 350
Molnar Laboratories 348
Nopco Chemical Company 340
Phoenix Laboratories 364
Robinette Research Labs 355
Rosner-Hixson Labs 353
Foster D. Snell, Inc. 367
R. Steckler Laboratories 340
Arthur H. Thomas 337
Truesdail Laboratories 360
U. S. Stoneware ..... Outside Back Cover
U. S. Testing Co. 344

NOPCO

CHEMICALS

SERVE MANY INDUSTRIES

Nopco takes pride in the fact that every Nopco product makes a problem obsolete. This is due to 50 years' experience in the chemicals field and never-ending research over the entire span of time. At your service is the knowledge we have amassed —and highly diversified technical staffs whose work is constantly anticipating the problems of many vital industries.

NOPCO PROCESSING CHEMICALS INCLUDE:

Esters • Ethylene Oxide Condensates
Amides • Metallic Soaps • Sulfonates
Water Soluble Polymers • Resin and
Wax Emulsions • Foamed Plastics

for

Surface Lubrication • Detergency
Sizing • Plasticizing • Softening • Emulsifying • Dispersing • Wetting • Defoaming • Thickening

NOPCO

NOPCO CHEMICAL COMPANY

Harrison, New Jersey

PLANTS:

Harrison, N.J. • Cedartown, Ga.
Richmond, Calif. • London, Canada

The Shippingport Atomic Power Station, Shippingport, Pa., was dedicated from Washington, D. C., by President Eisenhower on May 26, 1958. During the ceremony at the plant site, speakers were Philip Fleger, board chairman, Duquesne Light Co.; Lewis L. Strauss, chairman of the AEC; Mark W. Cresap, Jr., president, Westinghouse Electric Corp., and Rep. James E. Van Zandt of Pennsylvania.

Lists of papers to be presented at the International Conference on the Peaceful Uses of Atomic Energy, to be held in Geneva, Switzerland, September 1-13, 1958, may be obtained from Chemical Document Service, The Chronicle of United Nations Activities, 234 W. 26th St., New York 1, N. Y.

The Industrial Research Institute, Inc., and Interscience Publishers, 250 Fifth Ave., New York, N. Y., announce, as a joint undertaking, a new journal, *Research Management*, to be published quarterly. The subscription price is $7.50 per year.

R. STECKLER LABORATORIES

19220 Miles Ave. Cleveland 28, Ohio
Montrose 3-6575

Research • Product Development
Consultation • Market Research
Product & Process Evaluation

SYNTHETIC RESINS, POLYMERS, COATINGS
Fully Equipped Laboratory

EDITORIAL

The Bond Between Us

A RESOLUTION in support of the building fund campaign of the American Chemical Society was passed at the thirty-fifth Annual Business Meeting of THE AMERICAN INSTITUTE OF CHEMISTS, April 10, 1958, in Los Angeles, California. (See page 246, May 1958 issue of THE CHEMIST.)

In acknowledgement of this resolution, Dr. C. F. Rassweiler, F.A.I.C., president of the American Chemical Society, has sent a gracious letter to Dr. Emil Ott, AIC president:

May 27, 1958

Dear Emil:

The American Chemical Society appreciates the thoughtfulness of the American Institute of Chemists in enacting a resolution on April 10 presenting greetings, commendations, and best wishes for the success of our building fund campaign. The scroll on which this resolution is inscribed is a valued memento of the relationship between ACS and AIC.

The work of our respective organizations is supplemental, not competitive. The nature of our programs for the benefit of chemists and chemical engineers provides a common bond which is cemented by an overlapping membership. We trust that these relations can be strengthened in the future.

The American Institute of Chemists has recognized that the ACS needs additional space in order to continue present services to a growing membership. The building fund campaign, if successful, can free the Society of a heavy mortgage obligation. This will permit use of our revenues to continue present activities and to expand them to the benefit of the entire profession.

We are grateful to the Institute for its thoughtfulness in expressing, through this resolution, support of the many activities of this Society.

Cordially yours,

—C. F. Rassweiler

The many members of the AIC who are also members of the ACS will appreciate this expression of our mutual interests and cooperation.

The American Chemical Society has our best wishes and the support of many of our members in its endeavor to erect a new headquarters building.

Special AIC Announcements

Add to Charter Member List

Two more members should be added to the List of AIC Charter Members still with us (THE CHEMIST, p. 245, May 1958, and p. 289, June 1958), bringing the total to 75. One is Dr. John E. Schott, New York, N. Y., now retired from Socony Vacuum Oil Co., who in 1923 was associate professor of chemistry at the (then) State College, Pa. The other is Edward G. Williams, who, then and now, is head of the Edward G. Williams Labs., in New Orleans, Louisiana.

New Committees 1958-1959

At the June 4, 1958, meeting of the National Council, President Ott announced the appointment of the following Committees for 1958-1959:

Central Planning Committee

Dr. Henry B Hass, *Chairman*
Dr. Emil Ott
Dr. Wayne E. Kuhn
Dr. Lloyd Van Doren
Dr. Frederick A. Hessel
Dr. Lloyd H. Reyerson
Dr. Kenneth W. Newman
Dr. C. H. Fisher

Executive Committee

Dr. Emil Ott, *Chairman*
Dr. Wayne E. Kuhn
Dr. Lloyd Van Doren
Dr. Frederick A. Hessel

Committee on Honorary Membership

John H. Nair, *Chairman*
Dr. Emil Ott
Dr. Sidney D. Kirkpatrick
Dr. Harry L. Fisher
Raymond Stevens

Committee on Nominations

Dr. Emil Ott, *Chairman*
Dr. Wayne E. Kuhn
Dr. Lloyd Van Doren
The Chairmen of all of the Chapters

Professional Education

Karl M. Herstein, *Chairman*
Dr. John R. Bowman
Dr. Donald B. Keyes
Dr. Charles G. Overberger
Dr. Lloyd H. Reyerson

Qualifications

Richard L. Moore, *Chairman*
John H. Nair
Dr. Ernest I. Becker
Dr. Johan Bjorksten
John Kotrady

Ethics

Dr. Wayne E. Kuhn, *Chairman*
Dr. Max Bender
Dr. Martin De Simo
Dr. C. L. Brown
Dr. N. A. Shepard

Legislation Affecting Chemists & Chemical Engineers

Maynard J. Pro, *Chairman*

Gold Medal Award

Dr. Ray P Dinsmore, *Chairman*
Dr. Emil Ott
John H. Nair
Dr. Henry B. Hass
Dr. Lloyd Van Doren

Committee on Manpower

Dr. George L. Royer, *Chairman*
Dr. Herman S. Bloch
Dr. E. J. Durham
O. B. J. Fraser
Dr. N. A. Shepard

Chapter Activities

Martin B. Williams, *Chairman*
Dr. D. L. Cottle
A. D. Etienne
Joseph C. Hand, Jr.
Charles Holdt
Albert C. Holler
Robert E. Lacey
Harold A. Levey
Phil T. Pafford
H. F. Schwarz
Dr. Rudolph Seiden
Angus J. Shingler
George H. Taft

Membership

(To be Announced)

Employer-Employee Relations

Lawrence Flett, *Chairman*
O. B. J. Fraser
William Auchincloss

Clinical Chemistry

Dr. Kurt M. Dubowski, *Chairman*
Dr. Alfred H. Free
Dr. Warren M. Sperry

Constitution & By-laws

Benjamin Sweedler, *Chairman*

Student Medals

John Kotrady, *Chairman*
Dr. Delmar L. Cottle
Dr. Charles J. Marsel
Frederic C. McCoy
Robert H. Seavy

Pan-American Affiliates

Dr. Leo F. Pierce, *Chairman*
Dr. Winston R. deMonsabert
Dr. Ray P. Dinsmore

To Implement Objectives of the AIC

Dr. Lloyd A. Hall, *Chairman*
Dr. Max Bender
Dr. Ray P. Dinsmore

AIC History

Florence E. Wall, *Chairman*
Dr. M. L. Crossley
Dr. Albert P. Sachs
Dr. John A. Steffens
Dr. Lloyd Van Doren
Dr. Frederick W. Zons

Public Relations

Richard L. Moore, *Chairman*
Dr. Lloyd A. Hall
Dr. Kenneth W. Newman

Louisiana Chapter Officers

The Louisiana Chapter announces that the following officers will serve for the current fiscal year:

Chairman, Dr. W. P. de Monsabert, Chemistry Dept., Loyola University, New Orleans 15, La.

Vice Chairman, Cecil M. Shilstone, Shilstone Testing Labs., 814 Conti St., New Orleans, La.

Secretary-Treasurer Mack F. Stansbury, Southern Utilization Research & Development Div., P.O. Box 7307, New Orleans 19, La.

National Council Representative, Harold A. Levey, 311 Audubon Blvd., New Orleans 15, La.

The 1959 Annual Meeting

The 36th Annual Meeting of THE AMERICAN INSTITUTE OF CHEMISTS will be held May 6-8, 1959, at the Hotel Traymore, Atlantic City, N.J., with the New York and New Jersey Chapters as hosts. Dr. Wayne E. Kuhn, Dr. Max Bender, and Dr. Murray Berdick are planning the program for the meeting. John Kotrady is general chairman.

Niagara Chapter Elects

The Niagara Chapter has elected the following officers for the 1958-1959 fiscal year:

Chairman, Clarence A. Weltman, Alox Corporation, P.O. Box 556, Niagara Falls, N. Y.

Chairman-elect, J. Lyle Mahar, Coke Oven Lab., Bethlehem Steel Co., Lackawanna, N. Y.

Secretary, Dr. Howard W. Post, Professor, Chemistry Dept., University of Buffalo, Buffalo 14, N. Y.

Treasurer, Ray F. Seifert, Titanium Alloy Mfg. Co., National Lead Co., Niagara Falls, N. Y.

National Council Representative. Dr. Maurice H. Fleysher, National Aniline Div., Allied Chemical Corp., Buffalo 5, N. Y.

Dr. Ott to Speak Before Joint Meeting

The Northeastern Section of the American Chemical Society and the New England AIC Chapter will hold a joint meeting on October 9, 1958, with a program devoted to the professional interests and responsibilities of chemists. Dr. Emil Ott, AIC president, has been invited to be the principal speaker.

Western Chapter Officers

The following officers will serve the Western Chapter for the 1958-59 fiscal year:

Chairman, Thomas J. Kehoe, Beckman Instruments, Inc., 2500 Fullerton Road, Fullerton, Calif.

Chairman-elect, John Morrisroe, Pilot California Co., 215 West 7th St., Los Angeles 14, Calif.

Vice-chairman, Paul C. Ressler, Jr., Applied Physics, Corp., 2724 South Peck Road, Monrovia, Calif.

Senior Secretary, Quentin H. Coffman, Turco Products, Inc., 6135 So. Central Ave., Los Angeles, Calif.

Junior Secretary, Stuart R. Garnett, Blue Diamond Corp., Send mail to 506 West Almond St., Compton 4, Calif.

Treasurer, John A. Kaasen, Los Angeles County Air Pollution Control District. Mail to: 1124 North Mariposa Ave., Hollywood 29, Calif.

National Council Representative, Dr. Kenneth W. Newman, Turco Products, Inc., 6135 So. Central Ave., Los Angeles, Calif.

New York Chapter Officers

The New York Chapter elected the following officers at its annual meeting held June 4, 1958.

Chairman, George Foy, Fine Chemicals Division, Shulton, Inc., Clifton, N. J.

Chairman-elect, Dr. E. J. Durham, director, William H. Nichols Lab., New York University, New York 53, N. Y.

Secretary, Dr. Kurt S. Konigsbacher, Evans Research & Development Corp., 250 E. 43rd St., New York 17, N. Y.

Treasurer, Shepherd Stigman, 123 West 93rd St., New York 25, N. Y.

National Council Representative, Dr. Ernest I. Becker, Polytechnic Institute of Brooklyn, 333 Jay St., Brooklyn 1, N. Y.

New Officers For Ohio Chapter

At the Annual Meeting of the Ohio Chapter, the following officers were elected for the current season:

Chairman, Dr. Joseph H. Koffolt, Ohio State University, Columbus, Ohio.

Chairman-elect, Dr. James D. D'Ianni, Assistant to Vice President, Research & Development, The Goodyear Tire & Rubber Co., Akron 16, Ohio.

Secretary-Treasurer, Dr. Thomas R. Sweet, Associate Professor of Chemistry, Ohio State University, Columbus 10, Ohio.

Akron District Director, Dr. Anthony F. Finelli, Research Chemist, Goodyear Tire & Rubber Co., Akron 16, Ohio.

Cleveland District Director, M. E. Sibert, Section Head, Physical Chemical Research, Horizons, Inc., 2905 E. 79th St., Cleveland 4, Ohio.

Dayton District Director, Dr. Charles A. Dille, Director, Dille Labs., 393 West First St., Dayton 1, Ohio.

RESEARCH TESTING DEVELOPMENT in

Engineering, chemistry, metallurgy, textile technology, electronics, microbiology and psychometrics . . . from basic materials to finished products.

UNITED STATES TESTING COMPANY, INC.

Hoboken, N. J.

America's Most Diversified Coast-to-Coast Laboratory

BOSTON • BROWNSVILLE • DALLAS • DENVER

LOS ANGELES • MEMPHIS • NEW YORK

PHILADELPHIA • PROVIDENCE • SAN ANGELO

The Sale of Chemical Services in Counsellor Capacity

Harold A. Levey, Hon. AIC

President, American Products Mfg. Co., 311 Audubon Blvd., New Orleans, La.

(Paper presented when the author received Honorary AIC Membership at a meeting of the Louisiana AIC Chapter held Feb. 6, 1958, in New Orleans, La.)

PROBABLY one of the most potent forces militating against the earlier recognition of the chemist and the chemical engineer practicing as a "professional" is the fact that nearly 99% of this group are in the category of employees. The small remainder are self-employed as "consultants," or as I prefer, "counsellors"; either as their sole activity, or in conjunction with a teaching program, or some manufacturing or production work. The public reaction is based on the fact that the presently recognized professional groups, including medicine and law, are nearly all self-employed.

If we further examine these two types of professional chemists and chemical engineers, we find that the real difference is that each member of the 99% group usually has one employer, while the consultant has a large number of employers each year and at the same time.

There are other differences, but they are less significant. One of these is the basis of compensation for the consultant. Like the other professions, he may invoice his client based upon the time he has spent upon the work: or he may set a fee estimated on what he feels to be the value of his services to this client; or he may arrive at a fee based upon the ability of the client to pay.

Much of the service of the chemical consultant frequently involves the procurement of information not presently forming part of our store of knowledge. To supply this form of service obviously involves a program of research and development. It is quite difficult to set an exact fee in advance for this type of service, unless the problem has previously been solved (which it obviously has not), and so it is not possible to set a price for the time to be spent on this work for its solution. Therefore, the consultant really has to gain the full confidence of his client to allow him to proceed with a project of any magnitude, without being able to advise the client of the probable overall cost. This situation may be partially overcome by establishing fees to be paid in stages, as the work progresses, or by budgeting a predetermined sum for which the consultant agrees to devote a certain number of "laboratory hours" to the probable solution of a portion of the problem con-

tributing to the ultimate objective.

The term "laboratory hour" or similar term may be a measure of the time, effort, and material needed to attain the end desired. It usually includes one or more chemists, assistants, supervisory service, planning conferences, report writing, and the materials and use of the equipment needed. The amount of the budget or monetary sum assigned at the various stages is usually established by the consultant, based on its apparent proximity to technical problems previously solved. An option is usually extended to the client to terminate the work on completion of any of these stages and the submission of a written report and samples resulting from the laboratory services directed toward the solution of the problem. As the consultant is paid specifically to do research and development work, frequently patent applications are filed to cover these new findings, and these should be assigned to the sponsor, who sometimes pays an additional premium for such forms of success.

Another situation frequently prevails with reference to payment for professional services. Various branches of city, state and federal governments issue requests for bids for professional services. This procedure impresses professionals as being wholly unfitting. This method of getting bids on specifications attempts to establish fixed and uniform sets of conditions so that the only variable would be the price of the bidder. This is another aspect which distinguishes the professional from the tradesman. The variations in the capacities of the professional are based upon the extent of his training, type of experience, resourcefulness, and creative faculties. Obviously, the bidding process does not take into consideration these attributes. To overcome these shortcomings and to sustain the professional status of our technologists, a modification of the above scheme has been adopted by many branches of government and business. This modified plan is based upon such groups contacting the professional engineering societies to ascertain the present prevailing rates for certain types of technological services, and obtaining a list of five or ten consultants, engineering firms, or laboratories. These are arranged in alphabetic order. As the price has previously been fixed, selection can be made upon the basis of background of experience and applicable qualifications. When we are in need of their respective types of services, many of us select a physician or attorney on this basis.

There are other bases for compensation for services. Some of these are established by custom or precedent and include fees as technical counsel or expert in various civil and criminal courts.

Last, but not least, there are retainer fees, usually on an annual basis, effected by negotiation.

In addition to the relationships of client with counsellor, there are those of counsellor with his co-professionals, which may exist in a wide variety of forms. However, the temporary joint venture, with its limited legal implications, is the form which appears in the broadest extent. In this form, neither is in the employ of the other, but both merely arrange for a predetermined joint equity in the fees to be paid. If of short duration, and when relatively small fees are involved, our implied ethical code usually includes an exchange of information, and possibly recommendations among specialists in the various branches of our profession, without monetary compensation.

While range and variations in compensation for counsellors more or less parallel those received by the 99% group, however, there is that real enjoyment of independence of action and responsibility that characterizes the self-employed. But with it, that unique 1% periodically is reminded that, even after a generation or more of service, except for annual retainers, he still cannot take "a vacation with pay"!

Benefactor of Science and Scientists

Dr. C. H. Fisher, F.A.I.C.

Director of Division, Southern Utilization Research & Development, Div., A.R.S., U.S.D.A., 1100 Robert E. Lee Blvd., New Orleans 19, La.

(Presented when Harold A. Levey received Honorary AIC Membership at a meeting of the Louisiana AIC Chapter, Feb. 6, 1958, at New Orleans, La.)

HAROLD A. LEVEY has displayed competence and versatility as a chemist and engineer, as well as unselfish dedication and service to the profession of science and scientists.

He demonstrated his innate and varied abilities early in life. In 1910, he graduated from Tulane with a BE in chemical engineering; the following year, he obtained the BE in electrical engineering. In 1915, he completed courses in chemistry at the University of Illinois with the BS degree in chemistry, and in 1916, he obtained the MS degree in chemistry from the same university. Both his work and his experiences in professional life have been stamped with the same fine characteristics. He proved himself competent and versatile in research and consulting work on numerous problems requiring a sound knowledge of chemistry and engineering, economics, and law. Any man could well be proud and happy to have enjoyed his success in so wide a field of endeavor.

But most rewarding is the fact that his demonstrated competence and versatility in his scientific career have

been equalled by his devotion and selfless service to science and his fellow man. For more than three decades, his avocation has been counseling young men in the general field of chemistry and chemical engineering and aiding them in obtaining employment.

Recently, we have heard much about sputniks and the tremendous need to encourage our youth to go into science and to shape their careers for maximum benefit to themselves and our nation. If more people had, during the past thirty years, taken an active interest in the profession of chemistry and chemical engineering and had counseled and encouraged young scientists as ably as Harold Levey has, both our over-all welfare and our national security would be far sounder than they now are.

In addition to giving generously of his personal time and effort to help his fellow scientists, Harold Levey was instrumental in establishing the Louisiana AIC Chapter, and he has served as a national councilor of AIC. He has been and is an active member and administrator of the American Chemical Society, the American Institute of Chemical Engineers, and other professional societies. He has served as a representative of the profession in civic affairs and has furthered legislation for the advancement of the chemical profession.

He has set a splendid example for his fellow scientists as a consultant, manufacturer, and inventor of national standing. And surely most important of all, he has become an outstanding example of a man of high professional ethics and conduct, a good citizen and a true friend. On May 1, 1956, the Honor Scroll of the Louisiana AIC Chapter was awarded to him.

When the AIC chose him to receive Honorary AIC Membership, it was in recognition of his competence and versatility as a scientist and particularly for the spirit of unselfish service which he has displayed.

MOLNAR LABORATORIES
Organic Process Development, Control Laboratory and Pilot Plant Studies
Toxicology • Bacteriology • Biochemistry
Your Inquiries Invited
211 E. 19th Street, New York 3, N. Y.
Telephone: GRamercy 5-1030

RARE CHEMICALS
Tetranitromethane
Phosphorus Nitride
O. JOHNSON
92 ORCHARD STREET
Bloomfield, N. J.

Presentation to Harold Levey

HONORARY AIC Membership was presented to Harold A. Levey, F.A.I.C., consultant and president of American Products Manufacturing Co., 311 Audubon Blvd., New Orleans, La., at a meeting sponsored by the Louisiana AIC Chapter held at Maylie's Restaurant, New Orleans, La., on February 6, 1958. The chairman of the Louisiana Chapter, C. L. Hoffpauir of the Southern Regional Research Laboratory, U.S.D.A., New Orleans, presided.

Dr. C. H. Fisher, director of the Southern Utilization Research and Development Division, A. R. S., U.S.D.A., spoke on Mr. Levey's contributions to science and scientists. Extemporaneous remarks were made by Dr. George P. Meade, Mr. T. H. Hopper, and Prof. Paul Bailey on various facets of Mr. Levey's career. They pointed out that Mr. Levey's office for more than thirty-five years has been an informal clearing house for the employment of scientists, to many of whom he has been confidant, adviser, and counsellor. He was the chemical engineering representative on the Legislative Committee of the Louisiana Engineering Society for more than a decade and contributed to legislation in connection with the licensing of professional engineers in Louisiana. He holds nearly 50 U. S. and foreign patents, and has written many technical articles. His hobbies, in addition to encouraging young scientists, are music and photography.

Dr. Henry B. Hass, AIC president, presented the Certificate to Mr. Levey, who accepted it with a paper on "The Sale of Chemical Services in Counsellor Capacity." (This paper and Dr. Fisher's introduction appear on preceding pages.)

The citation of Honorary Membership reads:

To Harold Alvin Levey

In recognition of his high professional conduct in business and civic affairs, his encouragement to young men entering their careers, his unselfish devotion to the advancement of chemistry and chemical engineering; by all of which these professions have advanced in popular esteem.

The National Cylinder Gas Co. has changed its name to the Chemetron Corporation, 840 No. Michigan Ave., Chicago 11, Ill.

About AIC Members

Dr. William J. Wohlleben, F.A.I.C., emeritus head, Department of Chemical Engineering, University of Dayton, Dayton 9, Ohio, was honored this spring by the dedication of the new $1.6 million "William J. Wohlleben Hall of Chemistry and Chemical Engineering" at the University. Dr. Wohlleben's portrait, executed by John King of the Dayton Art Institute, dominates the main foyer of the building. Inscribed beneath the portrait is:

> "Bro. William J. Wohlleben, S.M. —Founder of the chemistry and chemical engineering departments of the University of Dayton — Teacher, guide and friend of students for half a century — Colleague respected and revered by his associates — Inspiration of this building erected in grateful recognition of his service."

Dr. V. V. Bellino, F.A.I.C., supervisor of the Industrial Wastes Section Lab., Barrett Division, Allied Chemical Corp., Frankford, Pa., has received the LL.B. degree from the School of Law of Temple University, and has successfully passed the Pennsylvania Bar examinations.

H. M. Zimmerman, F.A.I.C., manager, Plastics Division, Seiberling Rubber Co., Newcomerstown, Ohio, on May 14, accepted for the company a plaque from Mayor Dilfred Beiter of Newcomerstown. The plaque represented the city's appreciation to Seiberling for furnishing employment and taking part in community projects.

Arthur D. Little, Inc.
CONSULTANTS TO INDUSTRY
Research, Development, Engineering, Market and Economic Surveys
Cambridge; New York; Chicago; Washington, D.C.; Los Angeles; San Francisco; San Juan, Puerto Rico

Dr. Ulric B. Bray, F.A.I.C., general manager, Bray Oil Co., Los Angeles 63, Calif., announces the appointment of Gerard Greco to the sales staff of the Aircraft & Chemical Division, to serve under **Robert F. Connelly,** M.A.I.C., sales manager.

Dr. Frederick W. Stavely, F.A.I.C., director of the technical and physical research laboratories of Firestone Tire & Rubber Co., Akron, Ohio, has been elected president of the Industrial Research Institute, 100 Park Ave., New York 17, N. Y.

Dr. Harvey A. Neville, F.A.I.C., vice president and provost of Lehigh University, Bethlehem, Pa., announces that a grant of $64,050 to the University has been received from the Atomic Energy Commission.

Joseph K. Roberts, F.A.I.C., vice president in charge of research & development, Standard Oil Company (Indiana), Chicago 80, Ill., announces that J. B. Duckworth is now research coordinator.

(*Continued on page* 359)

The Collapse of Time

(Research and Our Way of Life)

J. Lewis Powell

Office of the Assistant Secretary of Defense (Supply and Logistics)
The Pentagon, Washington 25, D. C.

(Condensation of a paper given at the 35th Annual AIC Meeting, Ambassador Hotel, Los Angeles, Calif., April 10, 1958.)

BOTH industry and defense have as components "Time" and "Money." Let us start with a perspective on time. Man, as we know him, has been living on this planet for about 50,000 years. Let us condense this time scale, 50,000, down and pretend it occurred in 50 years. What would have happened?

10 years ago man stopped living in caves.

5 years ago someone invented picture writing.

2 years ago Christianity started.

15 months ago, the printing press was invented.

20 days ago, electricity was discovered.

18 days ago, the Wright Brothers flew first plane.

And almost everything that makes up the material world, from inside plumbing to jets and missiles, was invented within the last 24 hours!

Technology is continually avalanching faster and faster.

Now let us get a perspective on money. When I was a kid, "million" was usually reserved for bacteria. Now "million" and "billion" are both applied to money. When we talk about $35 billion dollar defense budgets, how big is a billion? The number of minutes since the year 1 A.D. till now is within 2% of "One Billion." So $35 billion would represent $35 a a minute since the year One.

More than $1000 a second or about $100-million a day is what this nation spends for defense. This is the premium for preparedness, based on the direct military budget alone. A community supports a fire department because it realizes there is no fool-proof method of fire prevention. Political uprisings and dictators are realities, too. These can cause wars, hence the need to support an Army, Navy, and Air Force.

Let us limit our discussion to the industrial facet of preparedness. Usually this is dismissed with the platitude that war has gone technological. What do we mean? Let us consider some specific examples.

(1) The B-52 aeroplane weighs better than 40 tons. Did you know it costs more than its weight in silver?

(2) Your clothes weigh 8 to 11 pounds, but the gear of a jet fighter weighs 144 pounds—a factor in logistics, too.

(3) A "B-17" was an important plane in World War II. Thousands

of them were built. But if you took all the engineering man-hours spent on all the B-17's ever built, you wouldn't have enough engineering man-hours to build one B-52.

(4) In the publication *Planes* of the Aircraft Industries Association, it is noted that "the electronic system alone" of a typical missile "has 36,000 to 37,000 separate items which must function properly if the missile's flight is to be successful." If each item is so reliable that it would fail only once in 100,000 times, the mathematical chances are that one missile in three would be a misfire.

(5) The S.S. United States and the S.S. America are the two largest American Merchant ships afloat. Yet, they could both be placed side-by-side on the flight deck of a Forrestal class carrier.

(6) The NIKE is a fairly simple missile, but Mr. William C. Burnett of Southern Bell says in the May-June issue of *The Military Engineer*:

> "The complexity of a NIKE system may be visualized from the following statistics: It contains approximately 1,500,000 parts, 217,000 feet of conductor wire, 2,000 feet of coaxial cable, 2,000 electron tubes, 12,000 resistors, 5,000 capacitors, 460 relays, 1,250 coils, 7,000 feet of interconnecting cables for the ground guidance section, 5,600 feet of similar cable for the missile handling section, a telephone switchboard for 20 or more lines, and many more items. The size and complexity of the job of making equipment to control the NIKE in flight requires the use of some 20,000 engineering drawings."

(7) Lindbergh's plane "The Spirit of St. Louis" with its powerful engine flew non-stop New York to Paris. If that engine had a little more power, today we could use it as a starter on a jet.

While war goes technological, technology has stampeded. Let us plot the "Curve of Technology" down through the ages. A good index of man's progress is the speed at which he can travel. So let us plot "speed." In Nero's time, or even 1500 years before that, man could travel only as fast as a horse could carry him. Thirty centuries later, when Columbus discovered America, the speed at which man could travel was still limited to the speed of a horse. Two centuries later, when Paul Revere made Longfellow famous, he was dependent on Dobbin. So, on our graph we would have a straight line from 1500 B.C. to about 1830. About then, after centuries of scientific stalemate, the "Iron Horse" broke the "Oat Barrier," and the technology of transportation was born.

In 1910, our first military airplane had a speed of 42 miles per hour. Thirty-five years later, persistence had pushed speed up to 470 miles per hour. Then in 1945, progress changed its pace again. It stampeded! In the decade from 1945 to 1955 man catapulted speed from 470 miles per hour to more than 1500 miles per hour!

Progress that formerly took years now takes weeks! The plodding progress which had characterized the first industrial revolution has been replaced by the synchronized research of organized science. Our curve which ran dead level for more than 30-centuries curved gently upward with an increasing slope from 1830 to 1945. Then it careened around a corner and shot skyward! The horizontal line has gone almost vertical . . . This stampede of progress was dramatically demonstrated over Long Island in 1956 when a Navy plane shot itself down by overtaking and colliding with its own bullets. Since then we have calmly accepted a jump from 1500 miles per hour to satellites and 18,000 miles per hour. Man now deliberately engineers progress by applied techniques of research and development. Progress is a product —produced on purpose.

This curve has been called "the Collapse of Time," because time is no longer the major ingredient in progress. Forget that we plotted this curve for speed, and substitute missiles, explosives, or medicine. The results are always the same . . .

Today, 170 million Americans thrive on the same land where one-million Indians starved from one famine to another. We have 7000 more people for breakfast every morning, yet our only problem is surplus. No other nation in the history of the world has ever been plagued by persistent surpluses . . . What have we got that the Indians did not have? . . . Three priceless ingredients: technology, democracy, and free enterprise!

TOXICITY TESTING
of FOOD, DRUG and COSMETIC INGREDIENTS

ROSNER-HIXSON LABORATORIES
7737 South Chicago Ave.
Chicago 19, Ill.

Technology gives us the tools of productivity; tools that multiply the might of man's muscles, extend the reach of his arms, and give him eyes that will measure precisely the 10,000th of an inch.

Democracy creates the climate for technology to blossom. Automobiles were developed in Europe before America. Yet Europe produced no Henry Ford with a democratic idea that every man should own an automobile.

Free enterprise. This is the catalyst that makes democracy and technology click to produce the fabulous new world way of life! This is the motive, the incentive—every man's opportunity to gamble on fame and fortune.

Mix technology, democracy, and free enterprise and you produce a standard of living and political freedom that makes the dreams of Utopian thinkers seem like the puny prod-

uct of backward imaginations.

Just as we exploit technology for peace and prosperity, we must also exploit it for national defense. Technology has no morals, it is not limited to America. It works with equal impersonal efficiency and grim effectiveness for good or evil, for friend or foe. This is the reality of the age we live in.

Modern war, is a head-on clash of total economies, total national resources, men, machines and materials. For this reason, military preparedness can be no better than the industrial readiness which backs it up. They both must be geared to the ever-changing technology of this age . . .

The mobilization needs of the United States break down into three general categories:

(1) Essential Civilian Requirements. These are the absolute necessities to keep your economy functioning. These are the materials for water supply, sewage disposal, fire-fighting, police protection, hospitals, food, clothing, and shelter.

(2) Defense Supporting Requirements. These are the things necessary to maintain your industrial economy so that it can produce military items. For example, freight transportation, communications, repair, maintenance, operating supplies, raw materials, electric power.

(3) Direct Defense Requirements. These are the guns, planes, tanks, ships, ammunition, missiles, etc., that are used directly by the Army, Navy, and Air Force.

These last are those with which I am primarily concerned, though all three kinds of requirements are essential to the pattern of preparedness.

The Business and Defense Services Administration of the Department of Commerce is primarily concerned with Essential Civilian and Defense Supporting items, while the Department of Defense is responsible for planning for Direct Defense items. These programs do not compete with each other. They are both part of the pattern of preparedness . . .

Being a democracy, we have no munitions industry. We have a civilian industry that makes peacetime products. When war comes, we have to mobilize our civilian industry for war, just as we mobilize our resources for any other disaster . . . Just as you have a fire plug to expedite the conversion of your water supply to fire fighting, so you have mobilization planning to expedite the conversion from peacetime production to war production.

Let us review our mobilization history: We started World War II with the most gigantic game of hide-and-seek on record. Everybody was "it." Thousands of industrialists descended on Washington to find out who in the military bought what. At the same time, thousands of military men scoured the country trying to find out who could make what. If

you wanted to buy a land mine, you couldn't look up the manufacturer in the Yellow Pages of the phone book. The man who could make a land mine didn't know what a land mine was, let alone know he could make it.

Two of the principal products we produced were "Surpluses" and "Shortages." We had ships without engines, planes without propellers, tanks without transmissions . . . If we are not going to have a big game of hide-and-seek next time, we had better match up our military producers and our military requirements now. Elementary preparedness demands that:

The military must always know
who can make what
how much can he make
how fast

Industry must always know
what military agency wants what
how much
how soon

The stampeding technology has erased the security which formerly was stored in stockpiles. The electronic wonder of today will be obsolete tomorrow. In the aircraft industry, they have a 20th century proverb: "If it flies — it's obsolete!" There is no longer any continuity of technology between wars. Each war involves a radically new technology. It is vital to maintain minimum stockpiles, but keep them up-dated and geared to progress in technological developments . . .

Matching specific potential military customers to individual potential producers is the basic step in all military industrial mobilization planning in the U.S. The principal program for doing it is the revised Production Allocation Program.

ROBINETTE RESEARCH LABORATORIES, INC.
Industrial Research • Consultation
Technical and Economic Surveys
Product Development
Chemical Market Research
16 East Lancaster Avenue
Ardmore, Pa. Tel. Midway 2-6457

The basic concept is similar to the Navy principle of "Battle Stations." On shipboard, at all times every sailor knows what he is expected to do in an emergency. Industrial Mobilization Planning gives "Battle Stations to Industry" by matching up military production schedules with specific planned producers . . . By having the military and industry do across-the-table planning in peacetime, the buyer and seller discover each other now. In event of war, this would:

1. Eliminate wartime hide-and-seek.
2. Spread the mobilization impact more evenly across our capacity.
3. Get better utilization of each plant since management has an opportunity to plan the use of its own plant.

Primarily, our planning is with prime contractors who fabricate items which meet the following criteria. The end use must be:

Survival and retaliation.
Increased combat efficiency.
Maintenance of health.
The items also must be hard to make and hard to get.

Planning for items of comfort, convenience, and morale is prohibited; but planning for about 500 items on a classified Preferential Planning List is mandatory.

If the Army, Navy, and Air Force, including all their branches, planned at will with every plant, industrial management would be run ragged answering the same questions over and over, for each service. Similarly, the services would compete with each other with conflicting claims for the same capacity. To prevent this we assign an Armed Services Procurement Planning Officer, or ASPPO, for each plant. His job is to represent all of the Armed Forces and act for the Assistant Secretary of Defense in coordinating all of the military planning with that plant. Any one wanting to plan with your company must funnel his request through your ASPPO.

There are two things you should do with your ASPPO:

(1) Help him make a good informative survey of your plant.

(2) Build your production know-how into mobilization production schedules before you sign them.

If you are a "Planned Producer," you and your ASPPO have a job to do. It is your job to balance military mobilization requirements against production capacity: to work out the best compromise between military logistic requirements and your plant capacity. Our planning is only as good as management and the ASPPO make it . . . It is up to the military to contribute logistic savvy—management supplies the production "know-how."

What is the mobilization line-up? Who plans for whom? The Department of Defense publishes a book called the "Register of Planned Mobilization Producers" (RPMP). It lists the 21,000 plants with whom we are planning and it cross-references each plant listed to the military departments that are planning it.

Every entry in the *Register* advertises to all Army, Navy, and Air Force Procurement planning officers that that particular producer is interested in planning for wartime production. For each plant, it also shows the ASPPO. Periodically, we purge the *Register* of dead-head entries; ones with whom planning has not materialized or those who want to write their own rules. Although the *Register* is a classified document, every manufacturer is entitled to see his own entry, or to be told he is not registered. This information can be obtained from the nearest Army, Navy, or Air Force procurement office.

If you are registered, you should:

1. See if your plant survey is up-to-date.
2. See if your mobilization schedules are current.
3. See if you are over-planned or under-planned.
4. Contact potential military customers—sell them on your ability.

If you are not listed in the *Register*:

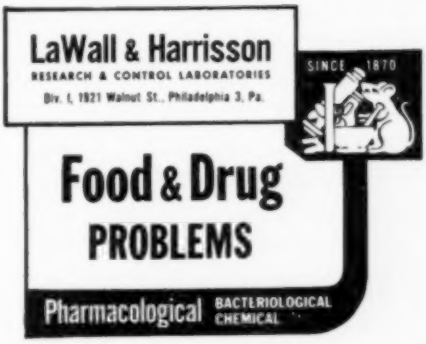
1. Determine if your production potential qualifies you to be a planned producer.
2. Identify and locate your potential military customers.
3. Sell your potential customers on your know-how and ability just as you would sell any other customer.

However, not all essential plants are, or should be, planned producers. This planning is limited to manufacturers of hard-to-get, hard-to-make, direct military items.

Since technology won't stand still, strategy, tactics, production and even planning itself must all be continuously revised to keep them reconciled with the reality of our ever-changing technology and our more complex weapons. The newer a weapon is, the more complex it is. Each newer, more complex, device is even more rapidly replaced by a still newer, even more complex device.

These truisms of technology give Uncle Sam a problem similar to the dilemma of a one-armed man on a flying trapeze. He has to let go of the ordnance and equipment of yesterday, yet the weapons of the future have not yet swung completely within reach.

"From Muscles to Missiles" is a whale of a leap! Today's war, whenever today may occur, would have to be fought with the transient weapons of that particular "today." A war can be equally lost with the obsolete weapons of yesterday or the new and as yet untried weapons of tomorrow . . .



The stampede of technological progress is real; it is the most profound technical fact of your life . . . In an age of stampeding technology we must find ways of accelerating our learning and thinking processes so that we may keep abreast of reality. Let us consider how the "horse" still dominates our thinking after half a century of automobiles. Consider the profound engineering principle that puts an automobile engine up front, so that you can have expensive complicated drive shafts, universals and other mechanisms to deliver the power to the rear wheels. Next time you stumble over the tunnel in the middle of your car, do it reverently. Remember that tunnel is a "monument" to the memory of the horse that used to be up front!

How much longer can we afford to let horse and buggy thinking dominate in this age of stampeding technology? Technology has out-distanced man's language and his imagination. An appropriate descriptive term of

reference for nuclear devices has not even been developed. To refer to a nuclear wapon as a bomb is as logical as it would have been to call the machine-gun a rapid fire improved automatic bow and arrow.

Planners suffer from a peculiar ailment. They always plan to fight the last one over. They are handicapped by experience.

Someone always asks the Sunday Supplement question, "Are we preparing for the long war or the short war?" Ask your fire department if it is planning on a big fire or a little one . . . As the Fire Department hopes never to have a fire, we just as fervently hope there will never be a war.

Since democracies don't start wars, any potential enemy automatically has the fantastic advantage of deciding where, when, and how war will start, if he elects to start one. Unpreparedness invites war. Therefore, our planning must be flexible enough to meet the reality of any time, place, and method chosen by the enemy . . .

Some of the arguments against mobilization planning are usually variations of the three basic arguments:

(1) Any new war would be overnight, so why plan? This is like saying there is no use studying first aid because if you get in an accident you are bound to be killed. In the event of war, victory may well go to the side which can first stagger back to its feet and deliver the second blow.

(2) We didn't use all of our plans for World War II or Korea, so why plan now? This is the logic which says if we didn't use all of the fire plugs in the last two fires, why have fire plugs?

(3) Planning is good but you shouldn't do it until you know your exact quantities of tanks, planes, ships, etc. This is the logic which says fire plugs are wonderful but don't install them until you know how much water it takes to put out a fire of unknown origin at an unknown time in an undetermined location.

The first purpose of mobilization planning is not to prepare to win wars! Its first purpose is to prevent war. Preparedness is a deterrent. When a potential enemy contemplates war, he estimates his chances of winning. The less prepared you are the better his chances. If, no matter what action he contemplates, you appear prepared, then he becomes discouraged . . .

There are probably occasions when you or I thought our fathers were behind the times. If you are five years behind the times in your thinking now, you are further behind the times than your father would have been if he were 25-50 years behind in his thinking. Time and progress plodded more slowly in his day—he lived on the flat curve. It took man 250 years to progress from the "short bow" to the "long bow," yet less than ten years to go from the A-bomb to the H-device.

Under these conditions, industry and defense are inseparable. Military preparedness is inextricably geared to

industrial readiness. Our nation's strength rests on the sound foundation of an alert, capable military-industry team.

A college education no longer lasts a lifetime. The T-model technology of your youth no longer exists. Technologically this is a different world, and you are a unique generation. Within your own lifetime you have personally witnessed more technological progress than happened in the previous 20,000 years. For better or worse, you are a kind of technological Adam standing on the threshold of a new world! You helped create it, yet you were so busy making it you didn't stop long enough to appraise your own handiwork.

When technology turned the corner, the dimensions of your world changed. Manpower is no longer the significant unit of international measurement. What really matters now is "brainpower." Who has it, how much, and how good! This curve illustrates the race for scientists and engineers. However, these are not enough! The factors of our political economy are not keeping pace with our technology.

Informed citizens are the premise on which democracy is based. We must restore the prestige of brains and the respect for intelligence and disciplined minds in every phase of American life . . .

NORMAN APPLEZWEIG ASSOCIATES

Specialists in
Applied Biochemistry

Product development consultants to the Food, Drug and Cosmetic Industries

131 Christopher St., New York 14, N. Y.
ORegon 5-1860

Dr. Bernard L. Oser, F.A.I.C., president of Food & Drug Research Labs., Inc., Maspeth, N. Y. received the 1958 Babcock-Hart Award for his services to nutrition and public health, on May 27, in Chicago, Ill., at the 18th Annual meeting of the Institute of Food Technologists. The award is granted annually, since 1948, by the Nutrition Foundation, Inc.

Dr. John V. N. Dorr, F.A.I.C., chairman of the board, the Dorr-Oliver Co., New York, N. Y., **Dr. Sidney D. Kirkpatrick,** Hon. AIC, editorial director of MacGraw Hill Book Co., New York, N. Y., and **Dr. Warren K. Lewis,** Hon. AIC, of Massachusetts Institute of Technology, received Founders Awards during the Golden Jubilee meeting of the American Institute of Chemical Engineers in Philadelphia, Pa.,

Dr. Howard S. Turner, F.A.I.C., vice president, Jones & Laughlin Steel Corp., Pittsburgh 30, Pa., has been elected to the board of directors of Industrial Research Institute, Inc., 100 Park Ave., New York 17, N. Y.

Dr. Julian Harrison Toulouse, F.A.I.C., chief engineer, quality and specifications, Owens-Illinois Glass Co., Toledo 1, Ohio, was chosen "Engineer of the Year," during National Engineers Week celebrated by 7000 engineers in the Toledo area. He was selected for his work during the past six years in developing a vocational guidance program in science and engineering for the 21 area high schools.

Dr. Herman F. Mark, F.A.I.C., director of the Polymer Research Institute at the Polytechnic Institute of Brooklyn, N. Y., spoke on "Progress in Stereospecific Polymers," June 12, before the Technical Club of the Thiokol Chemical Corporation, Trenton, N. J. He was introduced by **Dr. Edward Fettes,** F.A.I.C., director of research and development for Thiokol.

Miss Consuelo Kuhn, M.A.I.C., is now a publications writer at the Boulder branch of the National Bureau of Standards, Boulder, Colorado.

Tibor Wiener, F.A.I.C., chemical consultant, Los Angeles 55, Calif., is on an extended trip to visit the Brussels fair and various industries and universities in Western and Central Europe.

Dr. Johan Bjorksten, F.A.I.C., is in Europe for several months in personal charge of a new corporation, Bjorksten Basel Operations, Ltd., at Lautengartenstrasse 12, Basel, Switzerland.

American Cyanamid Co., dedicated one of the largest biological industrial waste treatment plants in the world at Bound Brook, N. J., June 5. **K. H. Klipstein,** F.A.I.C., executive vice president, stated that "Cyanamid is particularly pleased to be working so closely with its neighboring communities in the Bound Brook area to solve pollution problems."

Prof. Julian F. Smith, F.A.I.C., Lenoir Rhyne College, Hickory, N. C., is one of the lecturers for the workshop course entitled, "Scientific and Technical Abstracting & Indexing" being given by the School of Library Service of Columbia University this summer.

Dr. Eric J. Hewitt, F.A.I.C., vice president, Evans Research & Development Corp., New York 17, N. Y., announces the appointment of Dr. Winifred M. Cort as project leader in charge of enzyme research activities.

(*Continued on page* 363)

The Chemist and Air Pollution

Dr. Leslie A. Chambers

Director of Research, Los Angeles County Air Pollution Control District, 434 South San Pedro, Los Angeles, Calif.

(Presented, accompanied by film showing, at the 35th Annual AIC Meeting, Los Angeles, Calif., April 11, 1958.)

THE Los Angeles atmosphere has been described as a "chemical factory in the sky." It draws its raw materials from the great variety of industrial, commercial, domestic, and agricultural activities carried on in the basin, and derives its energy from the sun. In contrast with many eastern and European cities where soot, sulfur dioxide, and other flue gases constitute a major part of air pollution, Los Angeles is plagued by the consequences of incomplete combustion of petroleum products which constitute almost the sole source of energy in the community.

About seven years ago, Prof. Arie J. Haagen-Smit found evidence that the eye-smarting, leaf-damaging, visibility-reducing substances during periods of smog, are formed by reactions among hydrocarbons and oxides of nitrogen activated by radiation from the sun. Subsequent work has confirmed and substantiated in some detail this general concept. Even the light scattering particles which interfere with our view of the surrounding natural beauty are known to result from processes within this complex photochemical system.

It is evident that the talents of chemists and chemical engineers of many varieties are required to establish an operational understanding of the system; to identify the sources of specific pollutants; to develop source control techniques and mechanisms; to make analyses needed for enforcement of rules and regulations; to evaluate the performance of control installations, and to maintain cognizance of atmospheric contents in the interest of prevention of possible disaster.

To accomplish these things, the Los Angeles Air Pollution Control District employs substantial numbers of research chemists, chemical engineers, and analysts. We also retain the consultative services of eminent academic and industrial chemists; and tap the resources of local laboratories through the mechanism of direct research contract. In addition, increasing numbers of chemists associated with allied agencies, such as the Air Pollution Foundation, the U. S. Public Health Service, the Bureau of Mines, various universities, and independent laboratories, are devoting attention to aspects of the local air pollution problem. Add to these the large number of chemists employed by industries conscientiously attempting to meet their own air pollution control re-

sponsibilities, and it is obvious that air pollution control has become a sizeable reservoir of employment possibilities for many types of chemical specialty.

Since "smog" is obviously a resultant of interactions among substances arising from identifiable sources, the primary effort is directed toward elimination or reduction of pollutants at the source. For this purpose it is necessary to determine the nature of the pollutant and the amount; to devise suitable mechanical or chemical procedures for its removal; to establish legally acceptable standards of emission based on scientific evidence; to provide for periodic inspection of licensed equipment to insure effective daily operation, and to determine analytically continued performance within the standards established.

The District maintains an analytical laboratory, equipped to perform large numbers of routine analyses daily for such primary pollutants as hydrocarbons, particulate matter, oxides of nitrogen and of sulfur, organic aldehydes and acids, and others. The laboratory uses modern methods, including mass spectrography, emission spectroscopy, infrared and ultraviolet absorption, gas chromatography, in addition to the usual methods of bench chemistry. For some source surveys the district operates three mobile laboratories; these are variously equipped from time to time to meet the exigencies of the immediate problem.

Less usual analytical requirements of the control program are handled as research problems by the Research Section, which is composed of experienced organic, physical, photo-, and biochemists, associated with allied disciplines. The primary function of the research group is to develop fundamental knowledge of smog-forming processes, and to translate it into principles applicable in the control of smog and its sources. The work includes refined analyses of gas and vapor reactions in the low concentrations characteristic of atmospheric situations; determination of photochemical intermediates and end products and their relationship to eye irritation, plant damage, and visibility reduction. All research is currently directed toward solution of the two major remaining control problems: Automobile exhausts and organic vapor losses. Since the substances are broadly similar because of their usual petroleum derivation, the investigations involve similar requirements in areas of photochemistry, organic analysis, instrumentation, and reaction kinetics.

Since all regulatory action must be predicated on scientific proof of a need to control, in terms of adverse effect on one or more aspects of the community, the research requirement necessarily includes investigations of the toxicologic and physiologic effects of specific pollutants on plants, animals, and the human population. While

public health and agricultural studies of these types are conducted by agencies outside the District, such as health departments, medical schools, and agricultural experiment stations, they do occupy the attention of chemical specialists in the respective fields.

The District's activities include the continuous monitoring of the atmosphere for toxic gases and related pollutants. Such surveillance provides a basis for prompt remedial action, should dangerous concentrations of chemicals occur at any time. Development of the automatic monitoring instruments, maintenance of the network, and interpretation of measurements keeps chemical engineers and associated technical personnel occupied.

The regulatory program of the District, which includes a wide variety of source testing and analysis; review of plans prior to license for construction, and regular schedules of patrol and inspection, employs numbers of chemical engineers and others qualified to evaluate performance and exercise judgment.

THE LENTO PRESS, INC.

Distinctive Printing

441 Pearl Street New York, N. Y.

WOrth 2-5977

Application of Thermoanalytical Research Techniques — Thermogravimetry, Differential Thermal Analysis, Thermo-Volumetry — Development of Laboratory and Control Instrumentation

GORDON and CAMPBELL

Consulting Chemists

Foods, Pharmaceuticals, Minerals, Cosmetics, Metals, Ceramics, Polymers

Saul Gordon, Ph.D. 12 Brookfield Way
Clement Campbell Morristown, N. J.
JEfferson 8-7969

Harry B. McClure, Hon. AIC, vice president of Union Carbide Corporation, New York, N. Y., has been elected chairman of the Board of Directors of the Manufacturing Chemists' Association.

John B. Calkin, F.A.I.C., president of Calkin & Bayley, Inc., 50 E. 41st St., New York 17, N. Y., announces the acquisition of the consulting practice of the late Joseph J. Schaefer.

James G. Park, F.A.I.C., vice president of the Enjay Co., Inc., New York 19, N. Y., retires July first after 38 years of service. He resides at 439 Bronxville Road, Bronxville, N. Y.

Manuel M. Baiza, F.A.I.C., has accepted a position with the Research and Engineering Division of Monsanto Chemical Co., in Dayton, Ohio.

S. Bruce Humphrey, M.A.I.C., as of July first, is with the Carus Chemical Co., La Salle, Illinois.

The Chemist and Rockets

R. J. Thompson, Jr.

Rocketdyne, A Division of North American Aviation, Inc. Canoga Park, Calif.

(An abstract of a paper presented at the 35th Annual AIC Meeting, Los Angeles, Calif., April 10, 1958. The complete paper appears in *Chemical & Engineering News*, of June 23, 1958.)

THE rocket propelled missiles, satellites and space vehicles now under development or in their research phases are highly sophisticated, extremely complex mechanisms. Contributions from practically every field of physical science, engineering and technology are required for their successful development, fabrication and operation. The chemist contributes primarily through the selection, development and evaluation of the rocket propellant. Through his concern with the propellant, the chemist soon finds himself involved in nearly every phase of the rocket power plant development.

About 90% of the loaded weight of a large rocket powered missile is its chemical propellant. The full potential of the chemical rocket is still far from being realized in practice. Since the end of World War II, the specific impulses of operational rockets have increased only about 25% for both liquid and solid propellants. This relatively modest performance increase, together with major improvements in design, fabrication and operating techniques, have taken us from the approximately 150-mile range of the V-2 to the intercontinental missiles and satellites of today.

Theory indicates that a further increase of about 50% in the specific impulse of chemical systems is attainable over the operational systems of today. The chemist will need to apply all his skill, ingenuity and equipment in achieving the advances in propellant technology which will reduce these theoretical improvements to practice and thus provide the propulsive power required for our future exploration of outer space.

Corning Glass Works has placed in production at Big Flats, N. Y., the largest plant devoted to the fabrication of laboratory glassware.

The new address of Sun Chemical Corporation is 750 Third Ave., New York 17, N. Y.

PHOENIX

CHEMICAL LABORATORY, INC.

Specialists in Petroleum Products

Chemical Tests • Physical Tests

Qualification Tests

3953 Shakespeare Avenue
CHICAGO 47, ILL.

COUNCIL

OFFICERS

President, Emil Ott
President-elect, Wayne E. Kuhn
Secretary, Lloyd Van Doren
Treasurer, Frederick A. Hessel

COUNCILORS

Chairman of The Board, Henry B. Hass

Ernest Becker, *New York Chapter*
Johan A. Bjorksten, *At-Large*
Emmett B. Carmichael
Alabama Chapter
Charles H. Fisher, *At-Large*
Harry L. Fisher, *At-Large*
M. H. Fleysher, *Niagara Chapter*
D. M. Gans, *Ohio Chapter*
Lloyd A. Hall, *At-Large*
Karl M. Herstein, *At-Large*
Donald B. Keyes, *At-Large*
S. D. Kirkpatrick, *At-Large*
Harold A. Levey, *Louisiana Chapter*
K. W. Newman, *Western Chapter*
John H. Nair, *Past President*
L. H. Reyerson, *At-Large*
Hillary Robinette,
Pennsylvania Chapter
B. E. Schaar, *Chicago Chapter*
W. R. Sullivan,
New Jersey Chapter
George H. Taft,
New England Chapter
Max Tishler, *At-Large*
Albin H. Warth, *Baltimore Chapter*
Carl J. Wessel,
Washington Chapter
John L. Wilson, *Twin City Chapter*

Highlights of the April 9th Meeting

The 320th meeting of the National Council was held April 9, 1958, at 6:30 p.m., at the Ambassador Hotel, Los Angeles, California, with President H. B. Hass presiding.

The following officers, councilors, or alternates, were present: Messrs.: J. Bjorksten, R. P. Dinsmore, C. H. Fisher, H. L. Fisher, R. M. Fullaway, L. A. Hall, H. B. Hass, K. M. Herstein, J. H. Nair, E. Ott, and M. B. Williams. The following members of the Annual Meeting Committee, or alternates, were present: U. Bray, Q. H. Coffman, P. W. Jewel, K. W. Newman, L. F. Pierce, P. C. Ressler, Jr., F. Sawyer, P. J. Stupin, and A. J. Webber. L. T. Eby, R. H. Hass, J. L. Hickson, and V. F. Kimball were present.

The Secretary's Annual Report was presented, showing a total of 2803 members. The list of those deceased during the fiscal year was read,

and the Council observed a moment of silence in their memory.

Dr. Hall presented the progress report of the Committee on Implementing AIC objectives.

Dr. Bray, Dr. Ott, Dr. Newman, and Dr. Dinsmore, agreed to subsidize the attendance of ten high school science teachers, from the local area, to the AIC luncheon and the professional session on "The Chemist and Public Education," to be held on April 11th.

The Planning Committe presented its report, and it was agreed to hold the 1960 Annual Meeting in Minneapolis, Minn., and the 1961 Annual Meeting in Washington, D. C.

Dr. Hass discussed the project of the American Chemical Society for a new headquarters building. Dr. Harry L. Fisher, Dr. John L. Hickson, Karl M. Herstein, and John H. Nair, were appointed a committee to draft a resolution in support of this project to be brought up at the Annual Business Meeting on April 10th. (See page 247, May CHEMIST for this resolution.)

Dr. Hass read the names of the Charter Members, 75 in number, who are still with us, and the president was requested to send a letter of greetings to each on this 35th Anniversary year.

Mr. Nair presented the Treasurer's report and stated that the Treasurer's Annual Report would be prepared at the end of the fiscal year—April 30th.

The Council commended Dr. A. W. Fisher, Jr., Dr. Murray Berdick, and Karl Herstein, for the preparation of the new form of membership application blanks and reference forms.

After discussion, it was decided to adopt a goal of 7500 qualified members within the next five years.

The Secretary was asked to notify Members and Associates when they have had enough years of experience to qualify them for consideration for membership in the next highest rank.

The Secretary was requested to submit to AIC Fellows, for balloting, in accordance with Article VII of the Constitution, an amendment which would permit Associate members to vote for officers and councilors.

The Council expressed to retiring President Hass its deep appreciation of his service and wished him all sorts of good fortune as he continues as chairman of the Board of Directors during this fiscal year.

The Council expressed its deep appreciation for the conscientious work of Mr. Nair, who retires as chairman of the Board.

The following new members were elected:

FELLOWS

Allen, Albert B.
Manager, Quality Control Dept., Coca-Cola Export Corp., P.O. Drawer 1734, Atlanta, Georgia.

Copulsky, Dr. William
Commercial Research Director, Grace Research & Development Div. of W. R. Grace & Co., 3 Hanover Square, New York 4, N. Y.

Donahoe, Dr. Hugh B.
Associate Professor of Chemistry, Department of Chemistry, St. Louis University, 1402 South Grand, St. Louis 4, Missouri.

Hass, Dr. Robert H.
Senior Research Engineer, Union Oil Co. of California, Research Department, P.O. Box 218, Brea, Calif.

Lester, Dr. Charles T.
Dean, Graduate School, Emory University, Emory, Georgia.

Myers, Mrs. Elizabeth F.
Chemist, Board of Alcoholic Control, Old Health Bldg., Jones Street, Raleigh, North Carolina.

Reynolds, Dr. Robert B.
Dept. of Chemistry, Alabama College, Montevallo, Alabama.

Sterett, Charles C.
Physicist, Research Division, Redstone Arsenal, Huntsville, Alabama.

Vaughan, J. C.
Head of Science Dept., Huntsville High, Huntsville, Alabama.

Williams, Preston H.
Senior Staff Chemist, The Coca-Cola Company, P.O. Drawer 1734, Atlanta, Georgia.

Winstead, George A.
3819 Gallatin Road, Nashville 6, Tennessee.

MEMBERS

Carletta, Virginia J.
Chemist Analyst, The Toni Company, Div. of Gillette Co., 332 Rosabel Street, St. Paul, Minn

Clayton, Joe
Chemist, Southern Research Institute, 2000 Ninth Avenue South, Birmingham, Alabama.

Eckroth, Paul P.
Explosives Supervisor, E. I. duPont de Nemours and Company, Watson, Alabama.

Gamero, Robert
Research Chemist, Coast Pro-Seal & Mfg. Co., 1507 Grande Vista Ave., Los Angeles 23, Calif.

FOSTER D. SNELL INC.
RESEARCH AND DEVELOPMENT CONSULTANTS

Completely staffed with over 100 specialists, equipped with 10 stories of laboratories, backed by 36 years of experience in many fields:

Product Development - Analyses
Engineering - Market Research
Physical Measurement - Toxicology
Bacteriology - Animal Work
Food Technology

Bulletins and detailed information on request without obligation. Call WAtkins 4-8800 or write to:

FOSTER D. SNELL, INC.
29 W. 15 St., N.Y. 11, N. Y.

Jurgrau, Howard B.
Scientific Salesman, Fisher Scientific Company, 633 Greenwich Street, New York, N. Y.

Patrick, George L. Jr.
Staff Chemist, The Coca-Cola Company, 310 North Avenue, N.W., Atlanta, Georgia.

ASSOCIATES

Hubbard, Elbert M.
Attorney specializing in Patents, United States Army, Post JA Office, Redstone Arsenal, Alabama.

Nicoll, John W.
Research & Quality Control Chemist, Blue Diamond Corporation, 1650 South Alameda, Los Angeles, Calif.

Pritchett, Robert A.
Research Chemist, Tennessee Corp., Research Labs., 900 Roosevelt Highway, College Park, Ga.

RAISED FROM MEMBER TO FELLOW

Haverkamp, Warren F.
Chairman of Board & Technical Director, Columbia Wax Company, 530 Riverdale Drive, Glendale 4, Calif.

Shingler, Angus J.
Chemist, The Coca-Cola Company, P.O. Drawer 1734, Atlanta 1, Georgia.

Highlights of the April 11th Meeting

The 321st meeting of the National Council was held April 11, 1958, at 7:30 a.m., at the Ambassador Hotel, Los Angeles, California, with Dr. Emil Ott, new AIC president, presiding. The following officers, councilors, or alternates, were present: Messrs.: J. Bjorksten, C. H. Fisher, L. A. Hall, H. B. Hass, D. B. Keyes, K. M. Herstein, W. Kuhn, J. H. Nair, E. Ott, and M. B. Williams. J. R. Bowman, L. Eby, J. L. Hickson, K. W. Newman, and V. F. Kimball were present.

The present committees were asked to continue their work until new committees are appointed.

The Council expressed to the members of the Annual Meeting Committee and the Western Chapter appreciation and commendation for their work, done under difficult circumstances, to make the 35th Annual Meeting a success, including outstanding press coverage.

It was suggested that the Annual Meeting Committee write up its experiences in connection with arrangements, for information and assistance to future Annual Meeting Committees.

The problem of getting chemists to attend Annual Meetings during working hours was discussed. Suggestions were explored to find the best ways of reaching management to get its cooperation in encouraging chemists to attend professional meetings.

The date of the next Council Meeting was set as June 4, 1958, with luncheon at The Chemists' Club, New York, N. Y.

Opportunities

Doris Eager, M.A.I.C.

Positions Available

"Scientists of scientific bent," men with two to 15 years experience, having a doctorate in organic chemistry & pertinent experience. Knowledge of petrochemicals, especially monomers & polymers desirable. Petroleum company wishes to emphasize product development rather than process development hence needs new staff. Box 71. THE CHEMIST.

Director of Research. Ph.D. in Chem. or Chem. Eng. 10 to 15 years applied chemical research, product development. Five years at management or supervisory level. High-level business development outside of the laboratory. Of particular interest: plastics, petroleum, forest products, food, mining & metallurgy, aircraft, electronics and missiles. Age 35 to 45. West Coast, some travel. Base salary in $20,000 range, plus. Box 73, THE CHEMIST.

Chemists, engineers, physicists. Redstone Arsenal. Obtain "Announcement No. 5-35-1 (58)" and Form 57, Card Form 5001-ABC, and Standard Form 15, from Executive Secretary, Board of U. S. Civil Service Examiners, Redstone Arsenal, Huntsville, Alabama.

Chemists Available

Food Chemist. 31. M.S. chemistry. Successfully undertaking challenging administrative problems and directing basic & applied research programs of advanced technical nature. 8 years experience with modern research organization. Member of professional and honorary societies. Patents. Publications. Present salary $8000. Please reply to Box 70, THE CHEMIST.

The Percentage Spent On Research by the Pharmaceutical Industry

"Many financial analysts, and probably some directors also think in terms of how much of the sales dollar should be spent on research. It is difficult to see how this method of measuring research expenses can furnish results of practical significance, but because it is so widely used it will be considered briefly.

"The figures I have been able to assemble cannot purport to cover the (pharmaceutical) industry. They do, however, show the research expenses of eleven widely-known pharmaceutical companies and are probably fairly representative of the industry as a whole.

"Of these, the one that spent the largest percentage of sales on research in the past five years reached the level of 10.7% in one year, and the mean for all eleven was 4.8% of sales. This is high compared with other branches of the chemical industry. Of seventeen chemical companies whose stocks are listed on the N.Y. Stock Exchange, the one that spent the largest percentage of its sales on research, in any of the past five years, reached the level of 5.3% and the mean was 2.8% of sales. That these figures are pretty close to the industry average is borne out by a study conducted by the Industrial Research Institute and some other organizations in 1952 showing that of the pharmaceutical companies supporting research, the average expenditure amounted to 4.9% of sales, whereas in the industrial chemical field the ratio of research to sales was 2.9% and for companies making what were termed "miscellaneous" chemicals it was 2.4%.

Thus it is probably safe to say that in terms of percentage of sales the pharmaceutical industry spends more on research than other chemical companies."

—T. F. Davies Haines

The name of Law-Barrow-Agee Labs., Inc., Atlanta, Georgia, has been changed to Law Engineering Testing Company. George H. Nelson is president.

- **Glass clear**
- **Chemically inert**
- **Tough**
- **Flexible**
- **Easy to handle**

Tygon Tubing, Formulation R-3603, is the original transparent plastic tubing specifically developed to handle virtually every laboratory requirement. Flexible as string, Tygon makes tough lab. set-ups easy. Its glass-clear transparency permits better process control. Now in standard use among laboratories all over the world, versatile Tygon Tubing is available in more than 60 sizes.

Tygon is a registered Trade Mark of The U. S. Stoneware Co.

PLASTICS AND
SYNTHETICS DIVISION

495-E

U. S. STONEWARE

AKRON 9, OHIO